

**TRANSMITTAL LETTER TO THE UNITED STATES**  
**DESIGNATED/ELECTED OFFICE (DO/EO/US)**  
**CONCERNING A FILING UNDER 35 U.S.C. 371**

9926.1019

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

**09/980655**

INTERNATIONAL APPLICATION NO.  
PCT/FI00/00352

INTERNATIONAL FILING DATE  
April 25, 2000

PRIORITY DATE CLAIMED  
April 26, 1999

**TITLE OF INVENTION**

**METHOD AND DEVICE FOR MONITORING AND STORING THE PROPERTIES OF VARIOUS COMPONENTS**  
**OF A PAPER/BOARD OR PULP AND FINISHING/CONVERTING MACHINE AND/OR THE AMBIENT...**

**APPLICANT(S) FOR DO/EO/US**

Kari HASANEN, et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☐ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☒ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

**Items 13 to 20 below concern document(s) or information included:**

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Letter Re Priority

PCA/FI00/00352

9926.1019

24. The following fees are submitted:

CALCULATIONS PTO USE ONLY

**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :**

- ☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or IPO ..... \$1040.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or IPO ..... \$890.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$740.00
- ☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$710.00
- ☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$100.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$1,040.00

Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)).

☐ 20☒ 30

\$130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	9 - 20 =	0	x \$18.00
Independent claims	2 - 3 =	0	x \$84.00
Multiple Dependent Claims (check if applicable)			<input type="checkbox"/>

\$0.00

\$0.00

\$0.00

**TOTAL OF ABOVE CALCULATIONS =**

\$1,170.00

☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.

\$0.00

**SUBTOTAL =**

\$1,170.00

Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)).

☐ 20☐ 30

\$0.00

**TOTAL NATIONAL FEE =**

\$1,170.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).

☐

\$0.00

**TOTAL FEES ENCLOSED =**

\$1,170.00

Amount to be:  
refunded \$  
charged \$

- a. ☒ A check in the amount of \$1,170.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0518. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

STEINBERG & RASKIN, P.C.  
1140 Avenue of the Americas  
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SIGNATURE

Martin G. Raskin

NAME

25,642

REGISTRATION NUMBER

October 26, 2001

DATE

9926.1019

**UNITED STATES PATENT AND TRADEMARK OFFICE**

Re: Application of: Kari HANSANEN  
Serial No.: Not yet known  
Filed: Simultaneously  
For: **METHOD AND DEVICE FOR  
MONITORING AND STORING THE  
PROPERTIES OF VARIOUS ...**

**PRELIMINARY AMENDMENT**

Assistant Commissioner of Patents  
Washington, D.C. 20231

October 26, 2001

Sir:

Prior to examination and calculation of the filing fee, please amend the above-identified application as follows:

**IN THE CLAIMS:**

Please amend the claims as to read as follows:

1. A method in a machine (20) for producing or finishing/converting paper/board or pulp, the method comprising

- monitoring and storing properties of various components of the machine (20)
- monitoring and storing the changes taking place in the properties and/or the ambient conditions and the changes taking place in them
- transmitting this stored data to the control unit (10) of the machine (20) and/or to a separate data processing system (4), [characterised in that the method further comprises the steps of]

(i) arranging in the component (1), a memory unit (2) which accompanies the component (1) when the component (1) is a functional part of the machine (20), in which memory unit (2) can be written and which can be read electrically, by magnetisation or optically;

(ii) storing in the memory unit at least those properties (A) of the component(1) which effect on the control values of the machine (20), said storing taking place in connection with the manufacture or servicing of the component (1) in question before the component (1) is taken for installation into the paper/board or pulp or finishing/converting machine (20), or taken t o b e

stored for later use as a functional part of the machine (20);

(iii) transmitting the data stored in the memory unit (2) to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or the separate data processing system (4) which is used for serving data to the control unit (10).

2. A method as claimed in claim 1, wherein between the control unit (10) and the separate data processing system (4) are arranged data transmission means (11 a, 11 b) for transmitting data from the data processing system(4) to the control unit (10) and from the control unit (10) to the data processing system (4).

3. A method as claimed in claim 1, wherein the component (1) comprises at least one sensor (6, 7, 8) observing the state of the component (1) and/or its ambient conditions, which sensor is connected to the memory unit (2), and the data (B) obtained from which concerning changes in the component (1) and/or its ambient conditions are stored in the memory unit (2) in the component (1) in question.

4. A method as claimed in claim 1, wherein in the memory unit (2) is continuously stored an amount of data (B) corresponding to a certain time interval which is obtained in an essentially uninterrupted manner from at least one observing sensor (6, 7, 8).

5. A device for monitoring and storing the properties of various components (1) of a paper/board or pulp and finishing/converting machine (20) and the changes taking place in them and/or the ambient conditions and the changes taking place in them, and for transmitting this data to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or to a separate data processing system (4), comprising a component (1), which is a functional part of the machine (20), is arranged a memory unit (2) accompanying it, in which can be written and which can be read electrically, by magnetisation or optically, in which memory unit can be stored at least those properties (A) of the component (1) which effect on the control values of the paper/board or pulp or finishing/converting machine (20) in connection with the manufacture or servicing of the component (1) in question before the component (1) is taken for installation into the paper/board or pulp or finishing/converting machine (20), or taken to be stored for later use as a functional part of the machine (20), and that data transmission means (9b, 3b) have been arranged for transmitting the data stored in the memory unit (2) to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or the separate data processing system (4) which is used for serving data to the control unit (10).

6. A device as claimed in claim 5, wherein between the control unit (10) and the separate data processing system (4) have been arranged data transmission means (11 a, 11 b) by means of which data can be transmitted from the data processing system (4) to the control unit (10) and from the control unit (10) to the data processing system (4).

7. A device as claimed in claim 5, wherein in the,component (1) has been arranged at least one sensor (6, 7, 8) observing the state of the component (1) andlor its ambient conditions, which sensor is connected to the memory unit (2), and the data (B) obtained from which concerning changes in the component (1) and/or its ambient conditions has been arranged to be stored in the memory unit (2) in the component (1) in question.

8. A device as claimed in claim 5, wherein in the component (1) is a roll and the information to be stored in the memory unit (2) which accompanies the roll concerns at least one of the following: diameter of the roll, weight of the roll, deflection of the mantle of the roll, the composition of the surface material of the mantle of the roll, surface roughness of the roll, hours of operation of the roll and operations carried out during the servicing of the roll.

9. A device as claimed in claim 5, wherein in the memory unit (2) can be continuously stored an amount of data (B), corresponding to a certain time interval, which is obtained in an essentially uninterrupted manner from at least one observing sensor (6, 7, 8).

*Marked-up version of claims as amended.*

1. A method in a machine (20) for producing or finishing/converting paper/board or pulp, the method comprising

- monitoring and storing properties of various components of the machine (20)

- monitoring and storing the changes taking place in the properties and/or the ambient conditions and the changes taking place in them

- transmitting this stored data to the control unit (10) of the machine (20) and/or to a separate data processing system (4), [characterised in that the method further comprises the steps of]

- (i) arranging in the component (1), a memory unit (2) which accompanies the component (1) when the component (1) is a functional part of the machine (20), in which memory unit (2) can be written and which can be read electrically, by magnetisation or optically;

- (ii) storing in the memory unit at least those properties (A) of the component(1) which effect on the control values of the machine (20), said storing taking place in connection with the manufacture or servicing of the component (1) in question before the component (1) is taken for installation into the paper/board or pulp or finishing/converting machine (20), or taken t o b e stored for later use as a functional part of the machine (20);



(iii) transmitting the data stored in the memory unit (2) to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or the separate data processing system (4) which is used for serving data to the control unit (10)[,].

2. A method as claimed in claim 1, [characterised in that] wherein between the control unit (10) and the separate data processing system (4) are arranged data transmission means (11 a, 11 b) for transmitting data from the data processing system(4) to the control unit (10) and from the control unit (10) to the data processing system (4).

3. A method as claimed in claim 1 [or 2], [characterised in that] wherein the component (1) comprises at least one sensor (6, 7, 8) observing the state of the component (1) and/or its ambient conditions, which sensor is connected to the memory unit (2), and the data (B) obtained from which concerning changes in the component (1) and/or its ambient conditions are stored in the memory unit (2) in the component (1) in question.

4. A method as claimed in [any of the claims 1 to 3] claim 1, [characterised in that] wherein in the memory unit (2) is continuously stored an amount of data (B) corresponding to a certain time interval which is obtained in an essentially uninterrupted manner from at least one observing sensor (6, 7, 8).

5. A device for monitoring and storing the properties of various components (1) of a paper/board or pulp and finishing/converting machine (20) and the changes taking place in them and/or the ambient conditions and the changes taking place in them, and for transmitting this data to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or to a separate data processing system (4), [characterised in that in the] comprising a component (1), which is a functional part of the machine (20), is arranged a memory unit (2) accompanying it, in which can be written and which can be read electrically, by magnetisation or optically, in which memory unit can be stored at least those properties (A) of the component (1) which effect on the control values of the paper/board or pulp or finishing/converting machine (20) in connection with the manufacture or servicing of the component (1) in question before the component (1) is taken for installation into the paper/board or pulp or finishing/converting machine (20), or taken to be stored for later use as a functional part of the machine (20), and that data transmission means (9b, 3b) have been arranged for transmitting the data stored in the memory unit (2) to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or the separate data processing system (4) which is used for serving data to the control unit (10).

6. A device as claimed in claim 5, [characterised in that] wherein between the control unit (10) and the separate data processing system (4) have been arranged data transmission means (11 a, 11 b) by means of which data can be transmitted from the data processing system (4) to the control unit (10) and from the control unit (10) to the data processing system (4).

7. A device as claimed in claim 5 [or 6], [characterised in that] wherein in the component (1) has been arranged at least one sensor (6, 7, 8) observing the state of the component (1) and/or its ambient conditions, which sensor is connected to the memory unit (2), and the data (B) obtained from which concerning changes in the component (1) and/or its ambient conditions has been arranged to be stored in the memory unit (2) in the component (1) in question.

8. A device as claimed in [any of the claims 5 to 7] claim 5, [characterised in that] wherein in the component (1) is a roll and the information to be stored in the memory unit (2) which accompanies the roll concerns at least one of the following: diameter of the roll, weight of the roll, deflection of the mantle of the roll, the composition of the surface material of the mantle of the roll, surface roughness of the roll, hours of operation of the roll and operations carried out during the servicing of the roll.

9. A device as claimed in [any of the claims 5 to 8] claim 5, [characterised in that] wherein in the memory unit (2) can be continuously stored an amount of data (B), corresponding to a certain time interval, which is obtained in an essentially uninterrupted manner from at least one observing sensor (6, 7, 8).

REMARKS

The claims were previously amended in response to the International Preliminary Examination Report. It is requested that these amendments be entered for purposes of the present application. Thus the amendments presented above are to the claims as previously amended in response to the International Preliminary Examination Report.

The claims have been amended to remove multiple dependencies therefrom. The amendments to the claims herein have been made to conform the claims to U.S. practice and have not been made for purposes of patentability.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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09/980655

1

Method and device for monitoring and storing the properties of various components of a paper/board or pulp and finishing/converting machine

- 5 The present invention relates to a method and device for monitoring and storing the properties of various components of a paper/board or pulp and finishing/converting machine and the changes taking place in them and/or the ambient conditions and the changes taking place in them, and for transmitting this data to the control unit of the paper/board or pulp or finishing/converting machine and/or to a separate data processing system.

It should be mentioned that here control unit refers to a control unit at any hierarchical level of the paper/board or pulp and finishing/converting machine, that is, it may be, for example, the machine's central control unit or one of the control units in the machine's decentralised automation system.

Paper/board or pulp and finishing/converting machines comprise a large number of different components which have to be replaced and serviced due to, for example, wear and breakdown. For this reason, instead of using the components proper, temporary components have to be used, components have to be removed from the machine for the duration of servicing the component in question, or an old component has to be replaced by a new one. Often, the properties of temporary, serviced or new components which have an effect on the control values of the machine, do not correspond to the properties of the original component. Such components are, for example, the rolls of the machines mentioned above. For example, when the surface material of a roll wears to such an extent that it becomes too uneven, the roll is usually replaced by a spare roll, in which case the properties of the spare roll do not correspond fully to the properties of the original roll, such as weight, mantle diameter, surface material and deflection.

It is previously known to enter the properties of a new or serviced component in the control unit of the machine in order that the control values of the machine

can be changed, if necessary, to correspond to the said component. This is currently carried out manually, which is laborious. It has also be noted that errors occur in manual entry which, in the worst case, result in the breakdown of the component in question or another component of the machine, or in a change in the quality of the production of the paper/board or pulp or finishing/converting machine due to an incorrect control value.

In addition, the data on the properties of the components, such as data on the diameter of the roll and other dimensional data, are written by hand on the surface of the components, for example, with chalk, or on a separate piece of paper which is attached to the surface of the component, which means that the data on the properties of a component may be lost, for example, during storage or transportation of the component. In such a case, the properties of the component in question have to be measured or determined again.

Furthermore, during transportation, the component may be subjected to, for example, intensive accelerations and impacts. During storage, the component is also often subjected to changes in the ambient conditions, such as temperature and humidity. The properties of, for example, the surface materials of rolls, such as polyurethane, change when subjected to temperature changes. Very often these changes are not noticed until they manifest themselves as disadvantageous changes in the quality of the end product, such as changes in the quality of paper in paper machines. Monitoring and storing the changes taking place in the properties of different components and the ambient conditions and the changes taking place in them per component, for example, during the production run, storage or transportation is almost impossible by using known methods and devices.

The aim of the present invention is to achieve a method and device for eliminating, or at least substantially reducing, the foregoing disadvantages.

To achieve these aims, the method relating to the invention is characterised mainly in that in the component is arranged a memory unit accompanying it, in

which can be written or which can be read electrically, by magnetisation or optically, in which memory unit are stored at least those properties of the components which affect the control values of a paper/board or pulp or finishing/converting machine in connection with the manufacture or servicing of a component in question, before the component is taken for installation into a paper/board or pulp or finishing/converting machine, or taken to be stored for later use, and that data transmission means are arranged for transmitting the data stored in the memory unit to the control unit of a paper/board or pulp or finishing/converting machine and/or a separate data processing system.

The device relating to the invention is, on the other hand, characterised mainly in that in the component is arranged a memory unit accompanying it, in which can be written or which can be read electrically, by magnetisation or optically, in which memory unit can be stored at least those properties of the components which affect the control values of a paper/board or pulp or finishing/converting machine in connection with the manufacture or servicing of a component in question, before the component is taken for installation into a paper/board or pulp or finishing/converting machine, or taken to be stored for later use, and that data transmission means have been arranged for transmitting the data stored in the memory unit to the control unit of a paper/board or pulp or finishing/converting machine and/or a separate data processing system.

Preferred embodiments of the invention are disclosed in the dependent claims.

The invention is described in greater detail in the following, with reference to the appended drawings which show some embodiments of the invention, in which

Figure 1 shows diagrammatically a paper machine roll with a read/write memory unit.

Figure 2 shows diagrammatically a roll in a paper machine, which roll has a read/write memory unit.

Figure 1 shows diagrammatically a paper machine roll 1 and the main principles for monitoring and storing the properties A of the roll 1, the changes taking place in them, and the ambient conditions and the changes taking place in them. Roll 1 is, for example, a calender roll, the mantle 5 of which is coated with a polymer. In the roll 1, preferably in its axle, is arranged a read/write memory unit 2 in which are stored, in connection with the manufacture or servicing of the roll 1, those properties A of the roll 1 which affect the control values of the paper machine 20. Such properties A of the roll 1 are, for example, its diameter, weight, the deflection of the mantle 5, the composition of the surface material of the mantle 5, surface roughness, hours of operation of the roll, and the procedures carried out during the servicing of the roll 1, such as grindings.

The data on the properties A of the roll 1 are stored in the memory unit 2, for example, by means of a separate data processing system 4, such as a PC, located at the service point, from which the data in question on the properties A of the roll 1 are transmitted by the data transmission means 3a to the memory unit 2. Furthermore, the properties A stored in the memory unit 2 can be read in the desired form, for example numerically, by transmitting the data on the properties A of the roll 1 by means of data transmission means 3b to a separate data processing system 4.

The sensors 6, 7, 8 observing the state of the roll 1 and the ambience are in contact with the memory unit 2. The sensors 6 are, for example, piezoelectric power sensors arranged in conjunction with the coating of the roll 1 mantle 5, by means of which sensors is measured the nip force exerted on the roll 1 mantle 5, which force is generated in a paper machine between a roll 1 and a backing roll 1 (not shown). Sensor 7 is a temperature sensor and sensor 8 an acceleration transducer.

Sensors 6, 7, 8 and any other sensors observing the properties A of the roll 1 monitor the changes taking place in them. When a change takes place, for example, in the ambient temperature while the roll 1 is being stored, the



temperature sensor 7 detects the change, which is stored in the memory unit 2 in contact with the temperature sensor 7. Similarly, when the roll 1 is moved, for example, from the place of service to the paper machine 20, the Acceleration transducer 8 detects any impacts that take place during the transfer, which may have a disadvantageous effect on the operating characteristics of the roll 1. The observation of the impact is also stored in the memory unit 2 in contact with the Acceleration transducer 8.

In general, therefore, between the manufacture or servicing of the component and its installation in a paper/board or pulp or finishing/converting machine 20, the properties A of the component and any changes in the properties of the component, ambient conditions and changes B in the ambient conditions are stored in the memory unit 2.

Between the memory unit 2 arranged in conjunction with the roll 1 in connection with the installation of the roll 1 in the paper machine 20 and the control unit 10 arranged in conjunction with the paper machine 20 are provided data transmission means 9a, 9b (Figure 2). By these means, the above-mentioned data stored in the memory unit 2 are transmitted to the control unit 10 where they can be read and processed. If necessary, the data can be transmitted from the control unit 10 to the memory unit 2. The data can be read and processed in a corresponding manner also by means of a separate data processing system 4.

The control unit 10 and the separate data processing system 4 are preferably also connected continuously or temporarily with each other by means of data transmission means 11a, 11b. The foregoing data are transmitted by means of the data transmission means 11a from the data processing system 4 to the control unit 10 and by means of data transmission means 11b from the control unit 10 to the data processing system 4.

Consequently, absolutely correct data on the properties A of the roll 1 are provided, for example, for the control unit 10, and the data do not have to be entered manually as before. This also makes possible the observation or

determination of the state of the roll 1 on the basis of possible memory data B stored in the memory unit 2.

5 The component preferably also incorporates sensors observing the operating conditions. In the rolls 1 relating to the disclosed embodiment, these sensors are thus, for example, piezoelectric sensors 6 arranged in conjunction with the roll mantle 5 and observing the nip force. The power sensors are also in contact with the memory unit 2, whereby the changes B in the nip force observed by the power sensors 6 are stored in the memory unit 2. Other  
10 operating conditions may also be observed by corresponding provision of sensors. It is, for example, useful to observe the operating temperature.

Especially in operating conditions, the properties of the roll 1 (or other component) and its ambient conditions change often, and thus also much data  
15 B relating to these changes is stored in the memory unit 2, which means that its memory capacity does not necessarily suffice to store all the data B. In such a case it is advantageous to have a "history of events" corresponding to a certain time period stored continuously in the memory unit 2. The memory unit 2 then contains preferably a certain amount of data stored at predetermined intervals  
20 from each sensor 6, 7, 8, the data forming for each sensor 6, 7, 8 an essential, continuous "history of events" corresponding to a certain time period. At the same time as data is stored in the memory unit 2, the very oldest stored data is deleted at specific intervals.

25 It is obvious that the arrangement described above does not apply only to a paper machine roll, but can also be applied to various other components of paper/board or pulp or finishing/converting machines, such as bearings, doctor blades, coating head apparatus, etc. Neither is the provision with sensors limited to concern the type of sensor arrangements relating to the embodiment  
30 described above.

Claims

1. A method in a machine (20) for producing or finishing/converting paper/board or pulp, the method comprising

- 5    - monitoring and storing properties of various components of the machine (20)  
     - monitoring and storing the changes taking place in the properties and/or the ambient conditions and the changes taking place in them  
     - transmitting this stored data to the control unit (10) of the machine (20) and/or to a separate data processing system (4),

10   c h a r a c t e r i s e d in that the method further comprises the steps of

(i)   arranging in the component (1), a memory unit (2) which accompanies the component (1) when the component (1) is a functional part of the machine (20), in which memory unit (2) can be written and which can be read electrically, by magnetisation or optically;

15   (ii)   storing in the memory unit at least those properties (A) of the component (1) which effect on the control values of the machine (20), said storing taking place in connection with the manufacture or servicing of the component (1) in question before the component (1) is taken for installation into the paper/board or pulp or finishing/converting machine (20), or taken  
20   to be stored for later use as a functional part of the machine (20);

(iii) transmitting the data stored in the memory unit (2) to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or the separate data processing system (4) which is used for serving data to the control unit (10),

25

2. A method as claimed in claim 1, c h a r a c t e r i s e d in that between the control unit (10) and the separate data processing system (4) are arranged data transmission means (11a, 11b) for transmitting data from the data processing system (4) to the control unit (10) and from the control unit (10) to the  
30   data processing system (4).

3. A method as claimed in claim 1 or 2, c h a r a c t e r i s e d in that the component (1) comprises at least one sensor (6, 7, 8) observing the state of the com-

ponent (1) and/or its ambient conditions, which sensor is connected to the memory unit (2), and the data (B) obtained from which concerning changes in the component (1) and/or its ambient conditions are stored in the memory unit (2) in the component (1) in question.

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4. A method as claimed in any of the claims 1 to 3, characterised in that in the memory unit (2) is continuously stored an amount of data (B) corresponding to a certain time interval which is obtained in an essentially uninterrupted manner from at least one observing sensor (6, 7, 8).

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5. A device for monitoring and storing the properties of various components (1) of a paper/board or pulp and finishing/converting machine (20) and the changes taking place in them and/or the ambient conditions and the changes taking place in them, and for transmitting this data to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or to a separate data processing system (4), characterised in that in the component (1), which is a functional part of the machine (20), is arranged a memory unit (2) accompanying it, in which can be written and which can be read electrically, by magnetisation or optically, in which memory unit can be stored at least those properties (A) of the component (1) which effect on the control values of the paper/board or pulp or finishing/converting machine (20) in connection with the manufacture or servicing of the component (1) in question before the component (1) is taken for installation into the paper/board or pulp or finishing/converting machine (20), or taken to be stored for later use as a functional part of the machine (20), and that data transmission means (9b, 3b) have been arranged for transmitting the data stored in the memory unit (2) to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or the separate data processing system (4) which is used for serving data to the control unit (10).

30

6. A device as claimed in claim 5, characterised in that between the control unit (10) and the separate data processing system (4) have been arranged data transmission means (11a, 11b) by means of which data can be

transmitted from the data processing system (4) to the control unit (10) and from the control unit (10) to the data processing system (4).

7. A device as claimed in claim 5 or 6, characterised in that in the component (1) has been arranged at least one sensor (6, 7, 8) observing the state of the component (1) and/or its ambient conditions, which sensor is connected to the memory unit (2), and the data (B) obtained from which concerning changes in the component (1) and/or its ambient conditions has been arranged to be stored in the memory unit (2) in the component (1) in question.

8. A device as claimed in any of the claims 5 to 7, characterised in that in the component (1) is a roll and the information to be stored in the memory unit (2) which accompanies the roll concerns at least one of the following: diameter of the roll, weight of the roll, deflection of the mantle of the roll, the composition of the surface material of the mantle of the roll, surface roughness of the roll, hours of operation of the roll and operations carried out during the servicing of the roll.

9. A device as claimed in any of the claims 5 to 8, characterised in that in the memory unit (2) can be continuously stored an amount of data (B), corresponding to a certain time interval, which is obtained in an essentially uninterrupted manner from at least one observing sensor (6, 7, 8).



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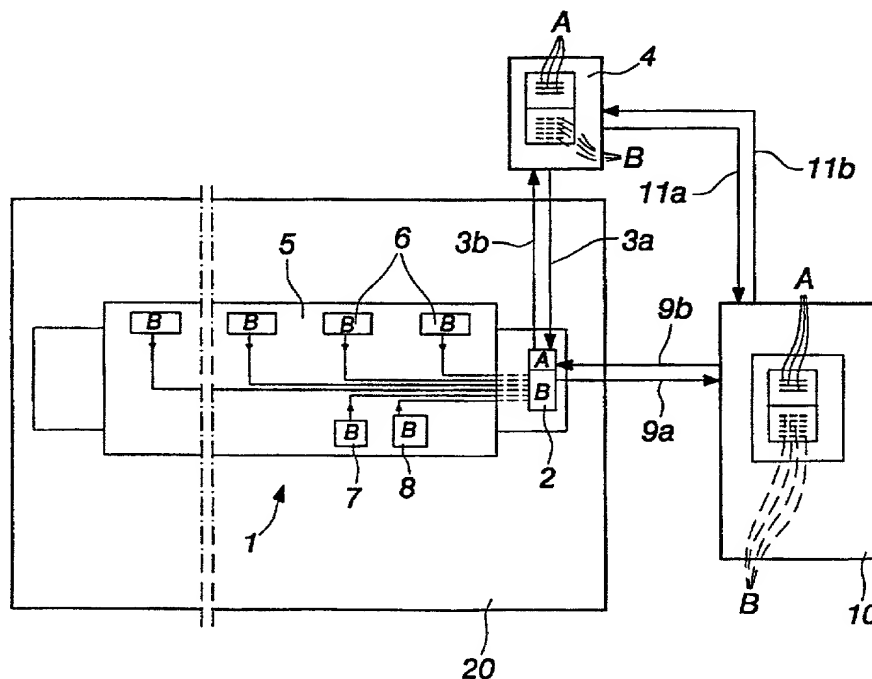
Published

With international search report.

(54) Title: METHOD AND DEVICE FOR MONITORING AND STORING THE PROPERTIES OF VARIOUS COMPONENTS OF A PAPER/BOARD OR PULP AND FINISHING/CONVERTING MACHINE

## (57) Abstract

The invention relates to a method for monitoring and storing the properties of various components (1) of a paper/board or pulp and finishing/converting machine (20) and the changes taking place in them and/or the ambient conditions and the changes taking place in them, and for transmitting this data to the control unit (10) of the paper/board or pulp or finishing/converting machine (20) and/or to a separate data processing system (4). In the component (1) is arranged a memory unit (2) accompanying it, in which can be written or which can be read electrically, by magnetisation or optically, in which memory unit are stored at least those properties (A) of the component (1) which affect the control values of a paper/board or pulp or finishing/converting machine (20). The method and device also comprise data transmission means (9b, 3b) for transmitting the data stored in the memory unit (2) to the control unit (10) of a paper/board or pulp or finishing/converting machine (20) and/or a separate data processing system (4).



1/1

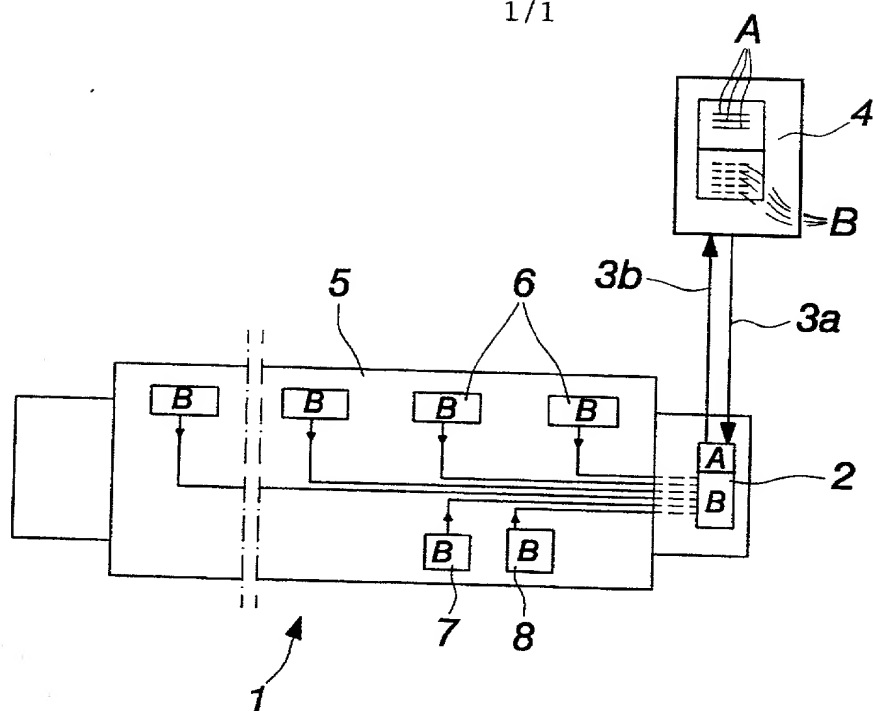


Fig. 1

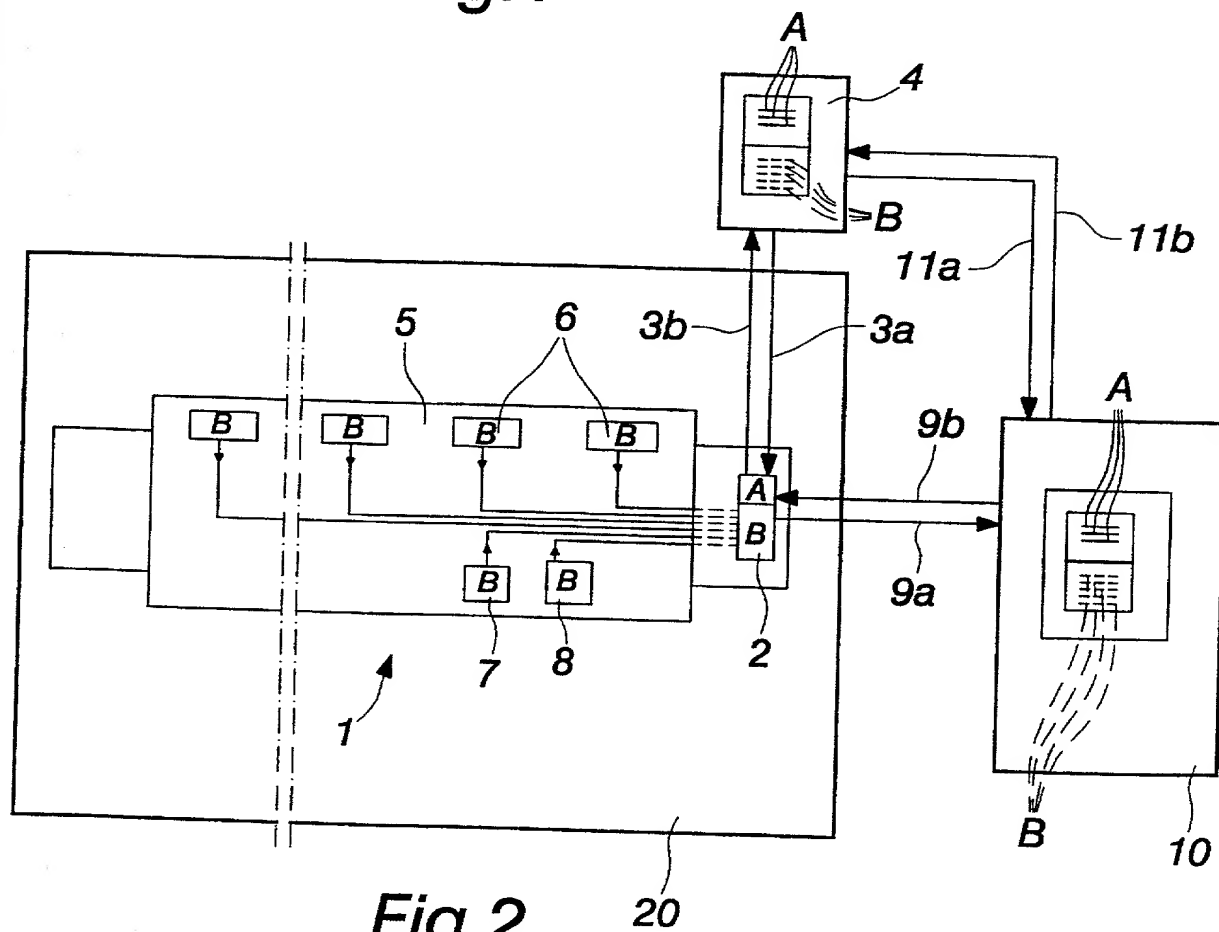


Fig. 2

# DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration submitted with initial filing

☒ Declaration submitted after initial filing (surcharge (37 CFR 1.6(e) required))

First Named Inventor: Kari HASANEN

COMPLETE IF KNOWN:

Application Number: 09/980,655

Filing Date: October 26, 2001

Group Art Unit: \_\_\_\_\_

Examiner Name: \_\_\_\_\_

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND DEVICE FOR MONITORING AND STORING THE PROPERTIES OF VARIOUS COMPONENTS OF A PAPER/BOARD OR PULP AND FINISHING/CONVERTING MACHINE AND/OR THE AMBIENT CONDITIONS AND THE CHANGES TAKING PLACE IN THEM.

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YY) 04/25/2000 as United States Application Number or PCT International Application Number PCT/F100/00352 and was amended on (MM/DD/YY) \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above. I acknowledge the duty to disclose information which is material to patentability of this application as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YY)	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
990931	Finland	April 26, 1999			X



I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YY)

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT International application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YY)	Parent Patent Number (if applicable)
PCT/FI00/00352	April 25, 2000	

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☒ Customer Number 21831

Direct all correspondence to:

☒ Customer Number 21831

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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